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I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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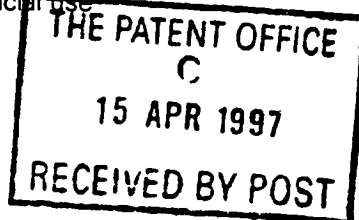
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Signed *A. B. Jones*

Dated 13 May 1998

For official use



15APR97 E267496-1 C21785
P01/7700 25.00

Your reference

9707577.4

15 APR 1997

Notes

Please type, or write in dark ink using CAPITAL letters. A prescribed fee is payable for a request for grant of a patent. For details, please contact the Patent Office (telephone 071-438 4700).

Rule 16 of the Patents Rules 1990 is the main rule governing the completion and filing of this form.

② Do not give trading styles, for example, 'Trading as XYZ company', nationality or former names, for example, 'formerly (known as) ABC Ltd' as these are not required.

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After an application for a Patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977 and will inform the applicant if such prohibition or restriction is necessary. Applicants resident in the United Kingdom are also reminded that under Section 23, applications may not be filed abroad without written permission unless an application has been filed not less than 6 weeks previously in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction revoked.

**The
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Request for grant of a Patent

Form 1/77

Patents Act 1977

① Title of invention

- 1 Please give the title of the invention **SUSPENDED WHEEL
ROLLER SKATES**

② Applicant's details

☒ **First or only applicant**

- 2a If you are applying as a corporate body please give:

Corporate name

Country (and State
of incorporation, if
appropriate)

- 2b If you are applying as an individual or one of a partnership please give in full:

Surname

- BRIDGES

Forenames

NORMAN STANLEY

- 2c **In all cases**, please give the following details:

Address

**1 HOLTWELL COURT
PLAYING PLACE
TRURO
CORNWALL**

UK postcode
(if applicable)

TR3 6EZ

Country

U.K.

ADP number
(if known)

5896638 001

Suspended Wheel Roller-skates.

This invention relates to independant trailing-arm suspension for roller-skate wheels.

Roller-skates, whether inline or paired wheel types, usually have their wheels rigidly fixed in chassis. Any shock absorbing function is usually provided by a pad located between boot and chassis on inline skates, or the axle on paired wheel skates mounted in rubber blocks. this arrangement tends to limit their use to reasonably bump-free surfaces.

According to this invention the wheels on their axles are located at the end of a trailing-arm suspension unit fitted at each wheel position allowing independent up and down movement of each wheel, the range of travel within the confines of two stops located on the chassis.

Three different applications of the invention will be described. In all versions the greater the number of wheels bearing the weight of the skater, the softer and more responsive the suspension will be.

All wheels are independent of each other except when ganged together via a connecting link positioned in slots provided in each trailing arm pinning together all or some of the units in line with each other therefore moving up and down as one unit. The advantages of the system are that the skates will mount what would normally be an obstacle to present skates with ease, and also gives added impetus to the skater as he thrusts forward with each leg as his weight has by compressing the springs of the suspension, stored energy in them which is released as he leaves that position. Speed skaters and roller-hockey skaters needing rapid acceleration benefit.

In the following detailed description of the application of the invention, three types will be described. A paired wheel skate with four or more wheels, preferably eight, and an inline skate with two or more wheels, preferably five wheels, mounted in two different types of chassis and a small variation in the suspension on one of them. Spring tension on all types is adjustable on all wheels, first for the overall weight of the skater, and then whether this weight is to be supported by one skate or two, or a compromise desired by the skater.

A detailed description of the invention will now be given using references to the accompanying drawings in which,

Sheet 1/3

Fig 1 and 2 show the trailing arm

Fig 3 Shows the view of an inline skate assembly on a single side chassis looking down from the boot.

Fig 4 depicts the tension spring common to all applications.

Sheet 2/3.

Fig 5 shows a section of an inline skate depicting the travel of the wheels against each stop. the same view would apply equally to a paired wheel skate.

Fig 6 is an end view of fig 5

Fig 7 shows a paired wheel skate using a T section chassis embodying the same components otherwise as the inline skate.

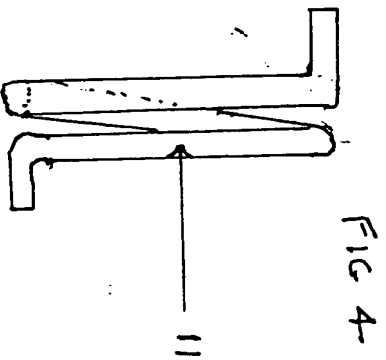
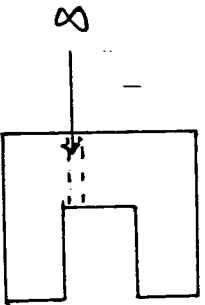
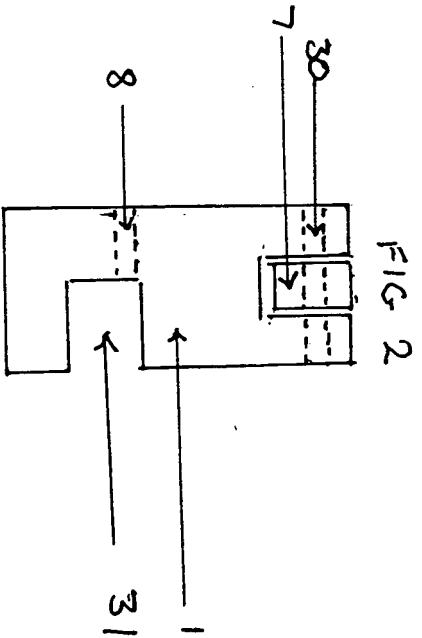
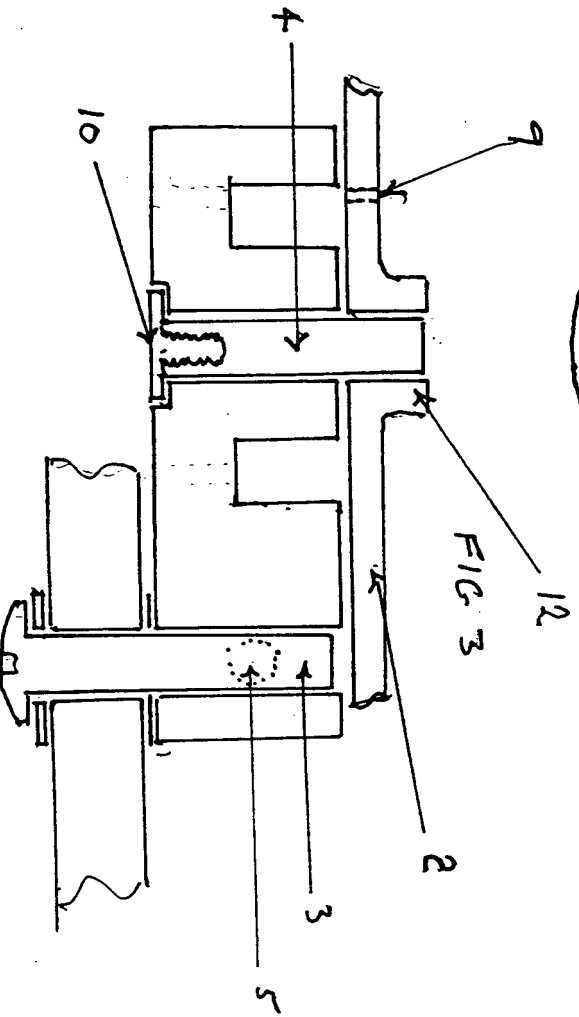
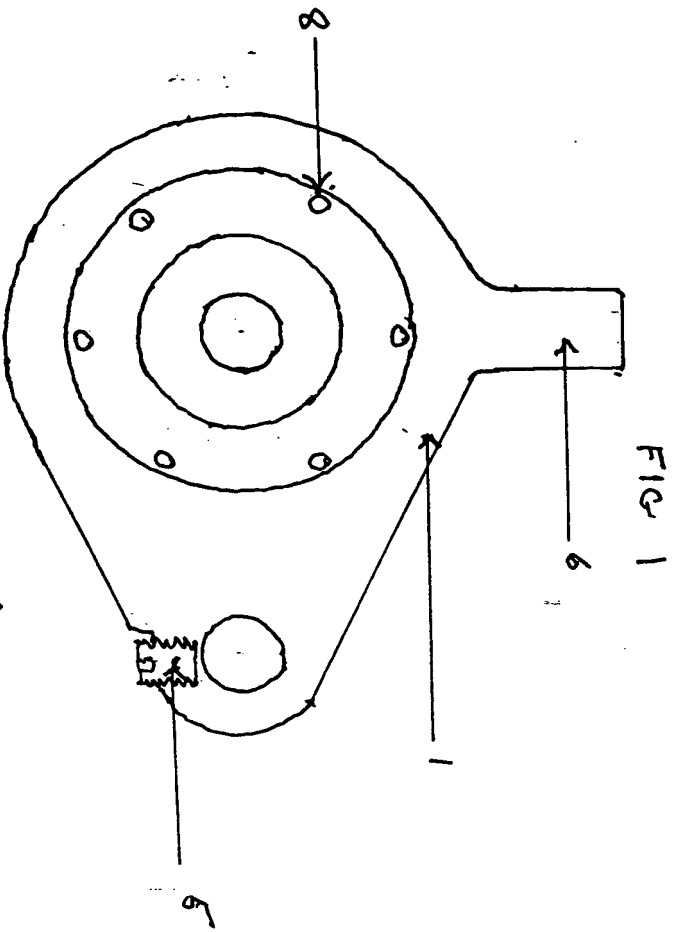
Sheet 3/3

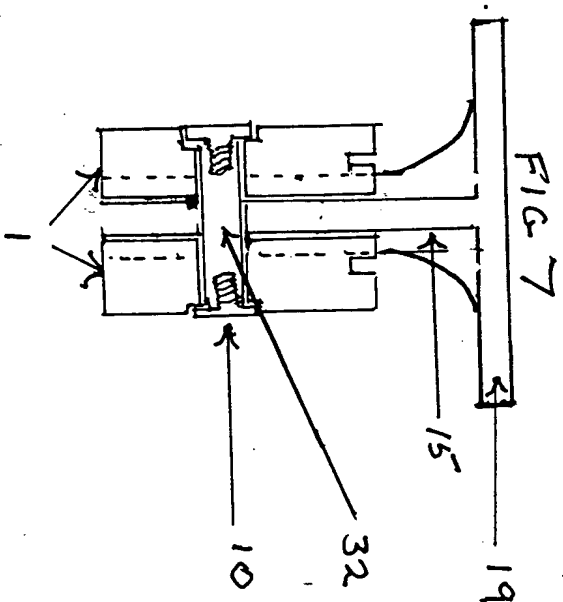
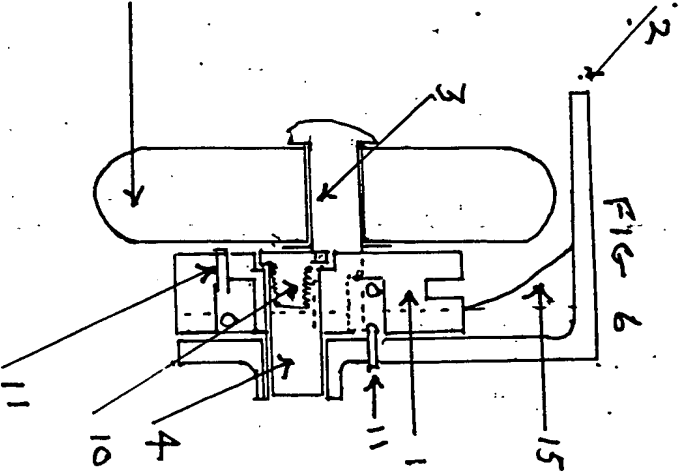
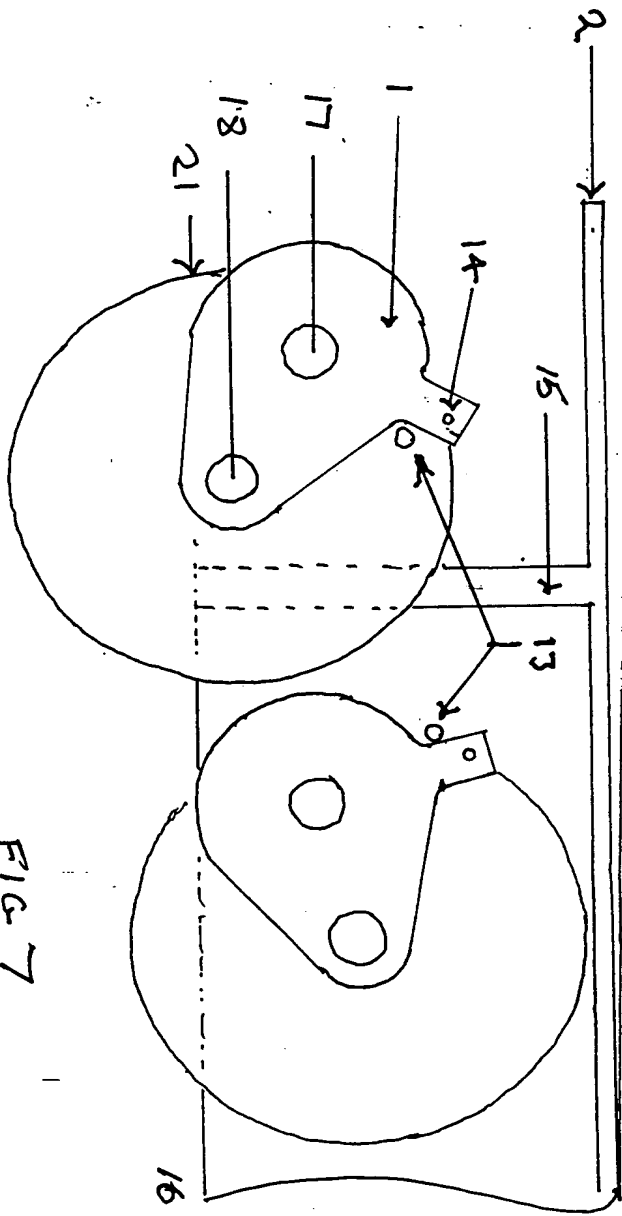
Fig 8 depicts a channel type chassis inline skate for heavy skaters using components exclusive to this design.

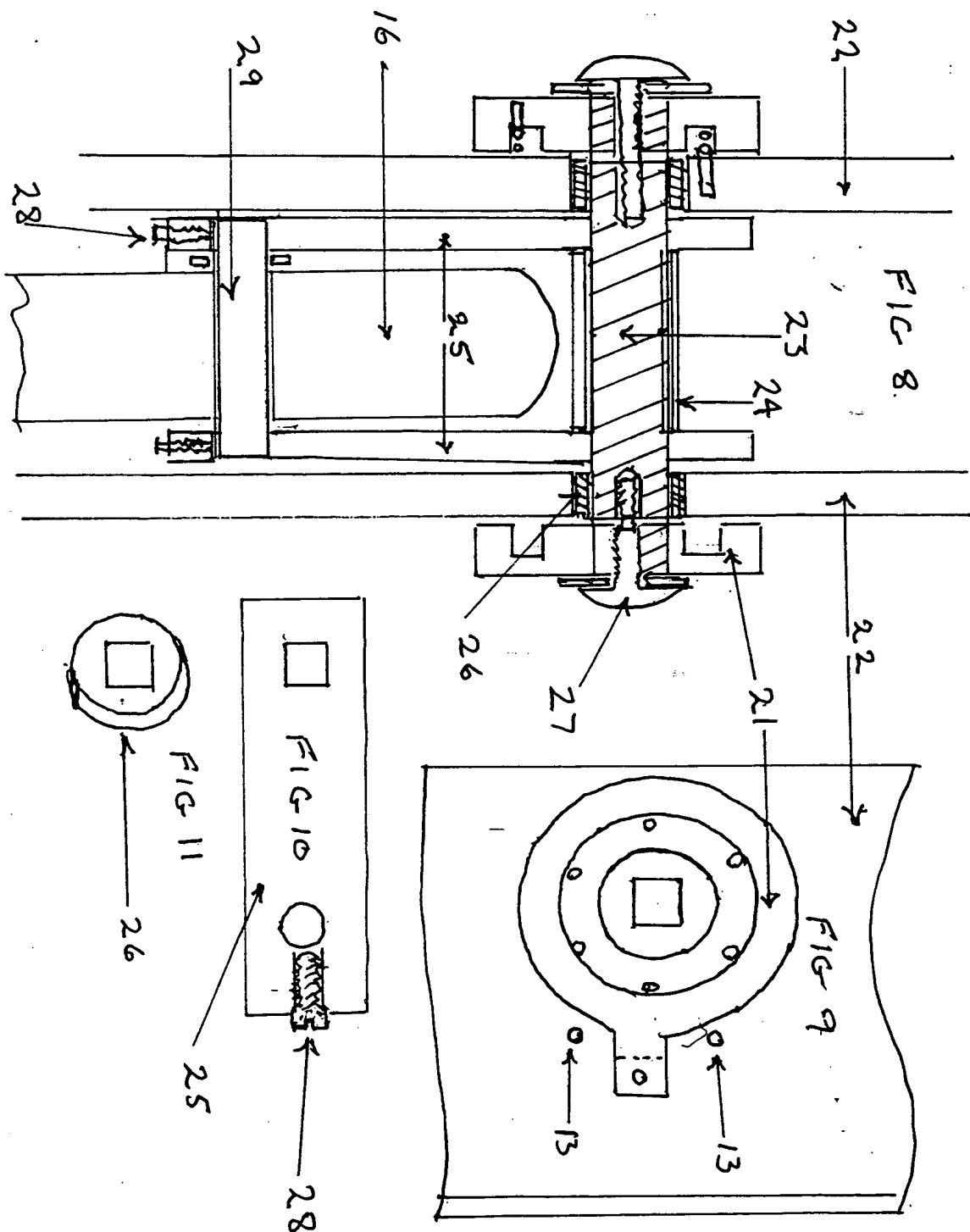
Fig 9 shows a spring housing as opposed to a trailing arm.

Fig 10 shows the separate trailing arms employed in pairs within the two sides of the chassis.

Fig 11 shows the bush or bearing which enables the square shaft to rotate in the chassis







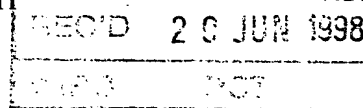


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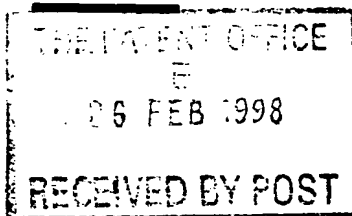
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Signed *A. Brewer*

Dated 13 May 1998

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06FEB98 E336091-2 D02902
P01/7700 25.00 - 9802474.8

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

1. Your reference

P1529-GB

06 FEB 1998

2. Patent application number

(The Patent Office will fill in this part)

9802474.8

3. Full name, address and postcode of the or of each applicant (underline all surnames)

BRIDGES Norman
1 Hollywell Court
Playing Place
Truro
Cornwall
TR3 6EY

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

589663400

4. Title of the invention

A CARRIAGE FOR A ROLLER SKATE

5. Name of your agent (if you have one)

K R BRYER & CO

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

7 GAY STREET
BATH
BA1 2PH

Patents ADP number (if you know it)

728848300

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

GB

9707577.4

15/04/97

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

NO

a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as an applicant, or

c) any named applicant is a corporate body.

See note (d))

A CARRIAGE FOR A ROLLER SKATE

The present invention relates generally to a carriage for a roller skate and to a roller skate incorporating such a carriage.

As used in this specification the term "roller skate" will be understood to refer to a fitting adapted to be worn on the foot of a user, and having a plurality of wheels or rollers by which the wearer can roll or "skate" over the ground. Two main roller skate configurations are known, namely a traditional roller skate comprising two pairs of wheels in fore and aft pairs with each pair being mounted for rotation about a common axis, often on a common axle, on a skate body. Each pair of wheels is referred to as a "truck" and such skates will therefore hereinafter be referred to as "truck" skates. More recently skates having a plurality of wheels in a single row individually mounted on a support so as to be in-line with one another have been introduced. Such skates provide rolling contact with the ground similar in many respects to the sliding contact of an ice skate. The carriage of such a skate is usually surmounted by a boot with secure ankle straps by which the user's foot can effectively be connected to the wheels. Having a plurality of wheels in an in-line configuration gives such skates an appearance resembling that of an ice skate with the wheels taking the place of an ice skate blade

minor imperfections in the surface.

All these attempts, however, provide only a very limited capability to absorb irregularity or roughness in the surface over which the skate passes and none have successfully managed to provide means by which large irregularities can be absorbed. In this context "large" in terms of the irregularity of a surface may mean surface asperities of the order of several centimetres, such as may be experienced on cobbled surfaces or very coarse tarmac, paving slabs, gravel or the like.

The present invention seeks to overcome the disadvantages of prior art roller skates by providing a roller skate carriage having means by which relatively large (as herein defined) excursions of the wheels can be made independently with respect to the roller skate carriage whereby to allow the carriage itself to move relatively smoothly over the surface.

According to one aspect of the present invention, therefore, there is provided a carriage for a roller skate in which each wheel is independently suspended on the carriage by a resilient suspension.

In this context a resilient suspension is to be understood to include any means by which a wheel may be secured to a roller skate carriage in such a way that

another along the body of the carriage in a single row, or may be arranged in coaxial pairs on the body of the carriage.

5 The suspension for each wheel may include a resilient member acting both to exert a resilient biasing force urging the wheel towards one end of its path of suspended travel with respect to the carriage and as a wheel guide member at least partly defining the path travel of the
10 wheel. Such resilient member may be a leaf spring. Alternatively, the resilient action of the suspension may be exerted by a compression spring and in one embodiment the compression spring is a coil spring which may be made of metal or plastics. Alternatively, a compression
15 spring formed as a chamber of compressible gas having a piston sealingly displaceable within it may act as the resilient member of the suspension.

Other forms of resilient member for the suspension may
20 include torsion springs which, in particular, may be a coil spring acting in torsion.

If leaf springs are employed these may be elliptical or semi-elliptical leaf springs or a generally U-shape leaf
25 secured by one limb to the carriage and carrying the wheel on another limb thereof.

Whatever the form of the resilient member of the

independently adjustable by respective adjustment means. It is always possible, of course, for the wheels to be linked together so that the individual independent suspensions are operated together.

5

The adjustment of the resilient suspension force may be effected by adjustment of the angular position of a locating member held in place by frictional engagement with a fixed part of the carriage or a member carried
10 thereby.

At the other end of its range of movement from the full-deflection position of the resilient suspension member there may be provided abutment stops on the body of the
15 carriage, engaged by a moveable part of the suspension whereby to extend the maximum extension travel of a wheel suspension.

Such abutment stops are preferably adjustable whereby to
20 adjust the said maximum extension position of a wheel.

Whatever the form of the skate carriage, that is whether it is a blade type or a truck type roller skate, the body of the carriage may include or comprise at least one
25 elongate plate-like member on which a plurality of individual wheel suspensions are carried. A single such plate-like member may be provided for a blade type roller skate in which the wheels are mounted in line with one

schematically, but not referenced) of a wearer.

The body of the carriage 11 comprises an L-section main member generally indicated 12 having, in the orientation of use illustrated in Figure 1, an horizontal flange 13 and a vertical flange 14. The horizontal flange 13 is secured by bolts (not shown) to intermediate plates 15, 16 in turn secured to the boot (not shown) of the roller skate, represented by the single line 17 in Figure 1.

10

Suspended from the vertical flange 14 of the carriage body 12 are four wheels 18, 19, 20, 21 which are all identical to one another: the wheels 18-21 are carried on respective transverse axles parallel to one another and perpendicular to the plane of the flange 14 such that the wheels 18-21 are in line for common rolling motion.

The suspension by which each wheel 18-21 is suspended from the carriage 12 is identical for each wheel, and therefore only one such suspension, namely that for the wheel 18, will be described in detail with reference to Figures 1, 2 and 3.

The wheel 18 is of a known type for unsprung roller blade type roller skates having a polyurethane outer perimetral "torus" and a central hub incorporating bearings which can be mounted, as seen in Figure 2, on a fixed axle 22 having a spacer sleeve 23 of larger diameter defining

are each bent axially to form engagement pins 38, 39 the former of which engages in the hole 33 in the bottom of the channel 28. The other engagement pin engages in a hole 40 of a cover disc 41 which, when the unit is assembled as illustrated in Figure 3, lies between the body 27 and the vertical flange 14 of the carriage body. The disc 41 has a central hole 42 through which passes a screw 43 which is threaded into the threaded hole 36 of the mount 34. In Figure 2 the flange 14 is represented by the small section thereof illustrated only for clarity. As the screw 43 is tightened it draws the cylindrical mount 34 through the cylindrical opening 31 of the boss 30 to press the cover disc 41 tightly against the flange 14. Because the cylindrical body 34 is longer than the thickness of the body 27 this latter is free to rotate on the mount 34 whereas the cover disc 41 is clamped securely by friction against the flange 14. The spring 37 can be pre-tensioned by appropriately orientating the disc 41 which, as can be seen in Figure 3, projects slightly below the lower edge of the flange 14 for this purpose. Once this adjustment has been made, however, it is possible to effect readjustment only with difficulty, by first removing the wheel 18.

The orientation of the body 27 in relation to the vertical about an axis passing through the centre of the cylindrical boss 30, can be varied by adjusting a threaded stop screw 44 which passes through a threaded

offers greater symmetry to resist stresses exerted on the axles 22 by the wheel 18 at the expense of additional material and therefore greater weight.

5 Figure 5 is an exploded view illustrating an alternative structure for the arm 26 which is employed in the embodiment of Figure 4. It has the advantage over the support arm structure of Figure 2 that the biasing spring force can be adjusted from an external point by a user
10 thereby enabling the user to vary the spring forces in play depending on the intended use and/or the user's weight.

Referring now to Figure 5 those components which are
15 substantially the same as, or fulfil the same function as, corresponding components in the support arm of Figure 2 have been identified with the same reference numerals. Thus, the wheel 18 has a spindle 22 carried in a hole 55 formed in an arm 26 of a suspension body 29. A grub
20 screw 56 engaged in a threaded hole at the end of the arm 26 which is not visible in Figure 5 locates the spindle 22 and secures it in position. A collar or spacer sleeve 220 spaces the wheel 18 from the arm 26.

25 In this embodiment the body 29 is carried on the flange 14 (schematically as shown in Figure 5) in the opposite orientation from that in which the corresponding body is located on the flange 14 in Figure 2. In other words,

embodiment of Figure 2 is provided with an adjusting screw which, however, is not shown in Figure 5 for simplicity.

5 Referring now to Figure 6 it will be seen that the arm 26 can be set to an inclined position (that is a position in which the line joining the pivot axis of the body 29 defined by the screw 43, and the axis about which the wheel 18 rotates, defined by the hole 55) is inclined to
10 the vertical by a small angle such that a downward load on the boot (or an upward load from an obstruction on the ground as the skate rolls over it) can cause the arm 26 to rotate about the pivot axis from the position shown in solid outline in Figure 6 to the position shown in broken
15 outline in this figure. The direction of advance of the roller skate is represented by the arrow A. Fine adjustments to the inclination of the arm 26 can be made by adjusting the screw 44 the end of which engages against the pad 47 of the abutment block 48.

20

In use of the roller skate of the invention, therefore, as the user passes over obstructions the impact can be absorbed by the rocking of the arm 26 about its pivot axis. Moreover, by suitable selection of the spring
25 rates and their adjustment, a skater can arrange that when pressing downwardly to push off during the skating action, all the wheels can be depressed concurrently so that the energy stored in the springs by this action can

CLAIMS

1. A carriage for a roller skate in which each wheel is independently suspended on the carriage by a resilient suspension.
5
2. A roller skate carriage as claimed in Claim 1, in which the resilient suspension of each wheel includes means for constraining the wheel to follow a predetermined path with respect to a body of the carriage upon deflection of the resilient suspension.
10
3. A roller skate carriage as claimed in Claim 1 or 2, in which the path of movement of a wheel upon displacement of the suspension is non-linear.
15
4. A roller skate carriage as claimed in Claim 14, in which the path of the suspension travel of a wheel varies in direction with a variation in the magnitude of the excursion from a static load position.
20
5. A roller skate carriage as claimed in any of Claims 3 to 4, in which the said constraining means comprise one or more trailing arm for each wheel.
25
6. A roller skate carriage as claimed in any preceding claim, in which the wheels are arranged in-line with one another along the body of the carriage in a single line.

13. A roller skate carriage as claimed in any of Claims 1 to 8, in which the resilient suspension includes a leaf spring.

5 14. A roller skate carriage as claimed in Claim 13, in which the leaf spring is generally U-shape and the wheel is carried by one another thereof via an axes and a bearing permitting the wheel to rotate with respect to the leaf spring.

10

15. A roller skate carriage as claimed in any preceding claim, in which the resilient suspension of each wheel thereof is substantially undamped.

15 16. A roller skate carriage as claimed in any preceding claim, in which the suspension travel of a wheel is inclined towards the rear carriage.

20 17. A roller skate carriage as claimed in any preceding claim, in which the wheels are carried by respective pivoted trailing arms mounted for rotation about respective axes pivotally substantially parallel to the axis of rotation of the wheel carried thereby.

25 18. A roller skate carriage as claimed in Claim 17, in which each said pivoted trailing arms houses a respective coil spring urging the arm to turn in a first direction about its first axis with respect to the carriage body.

24. A roller skate carriage substantially as hereinbefore described with reference to, and as shown in the accompanying drawings.
- 5 25. A roller skate comprising a carriage as claimed in any preceding claim, secured fixed an attached to a boot for receiving and supporting the foot of a user.

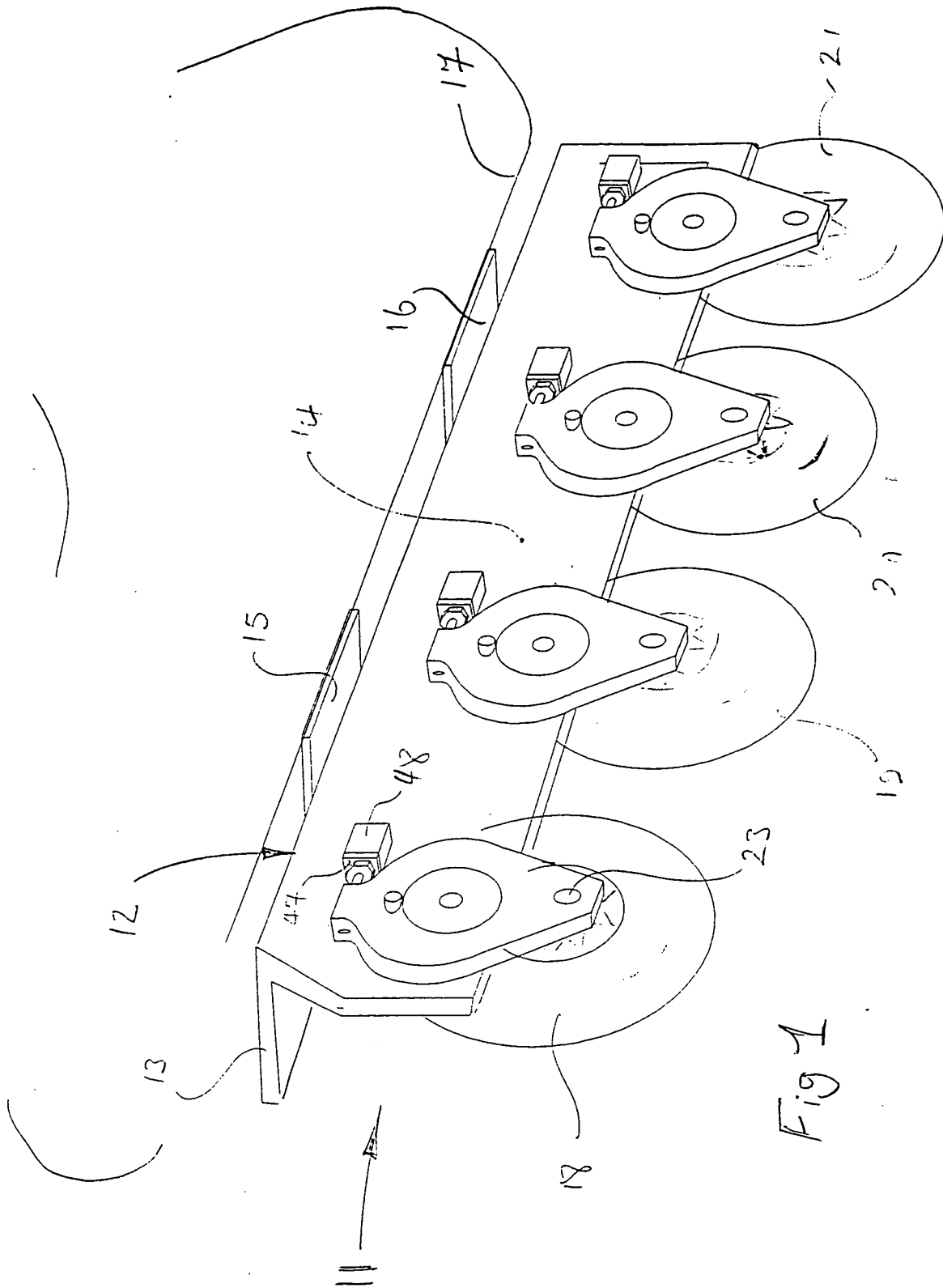
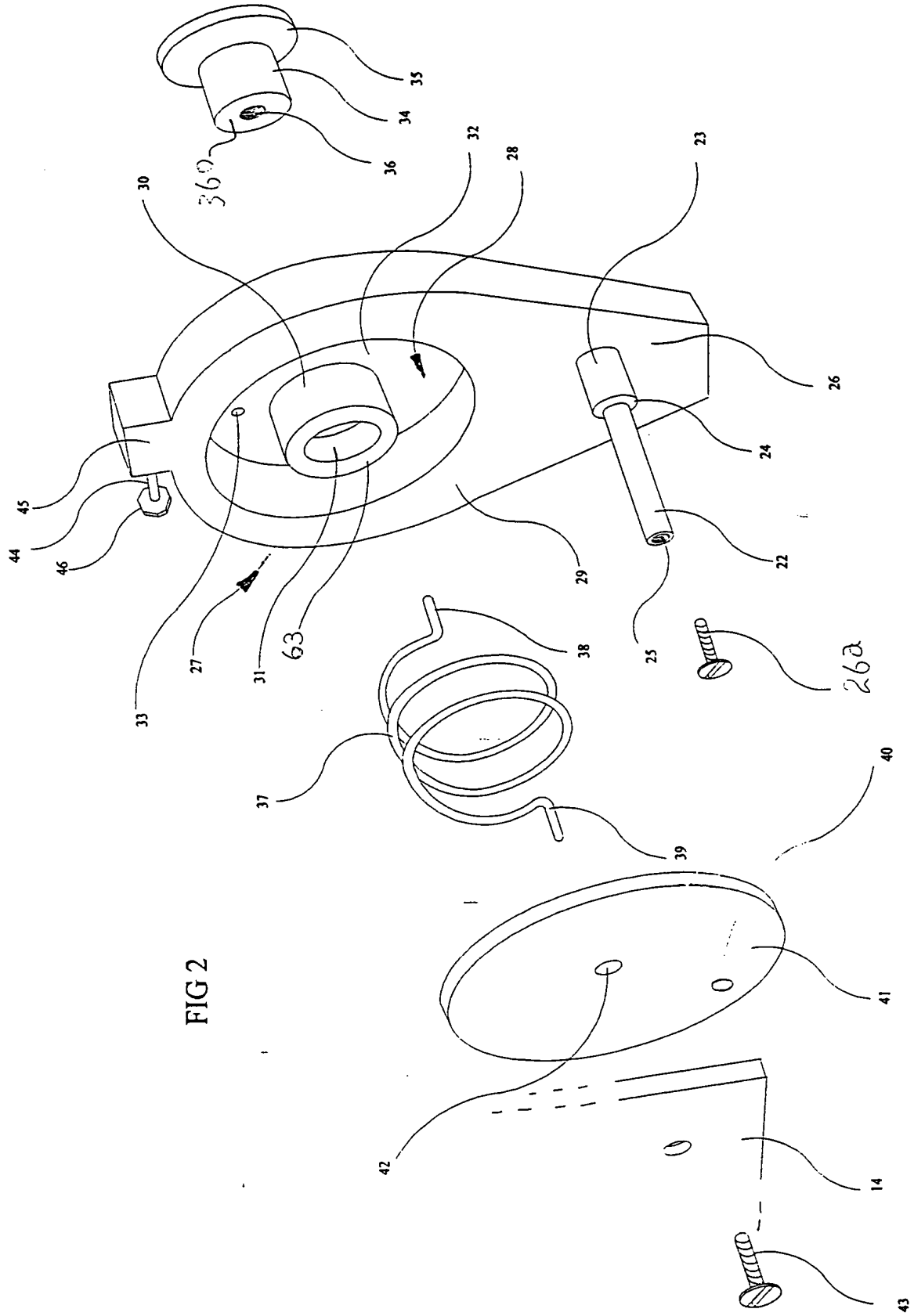
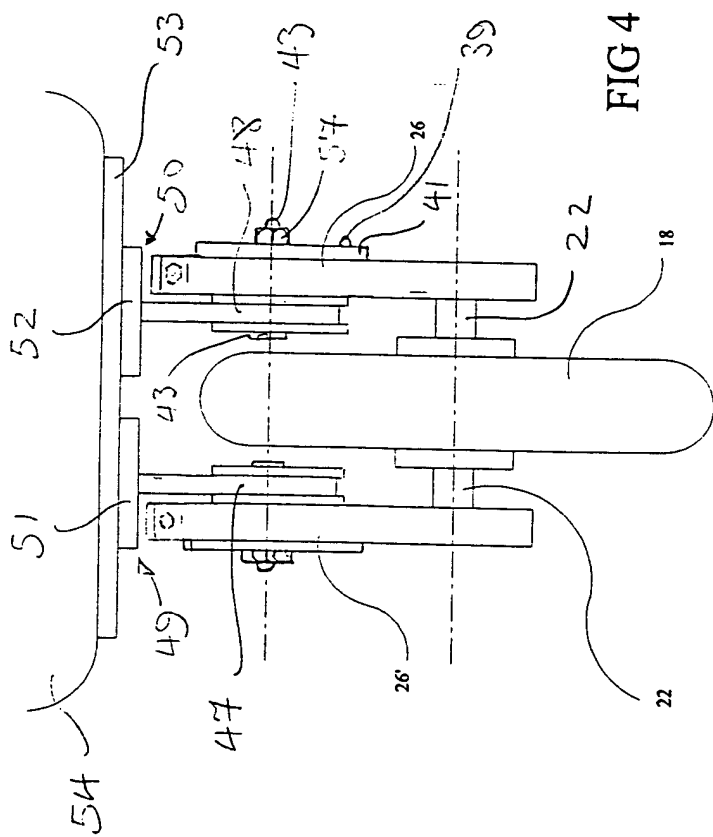
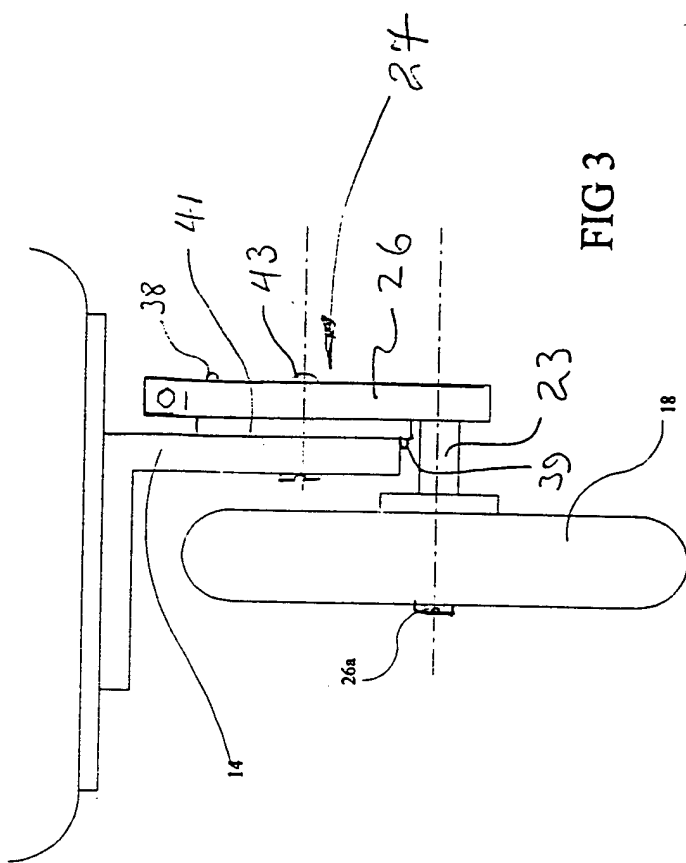


Fig 1



3/5



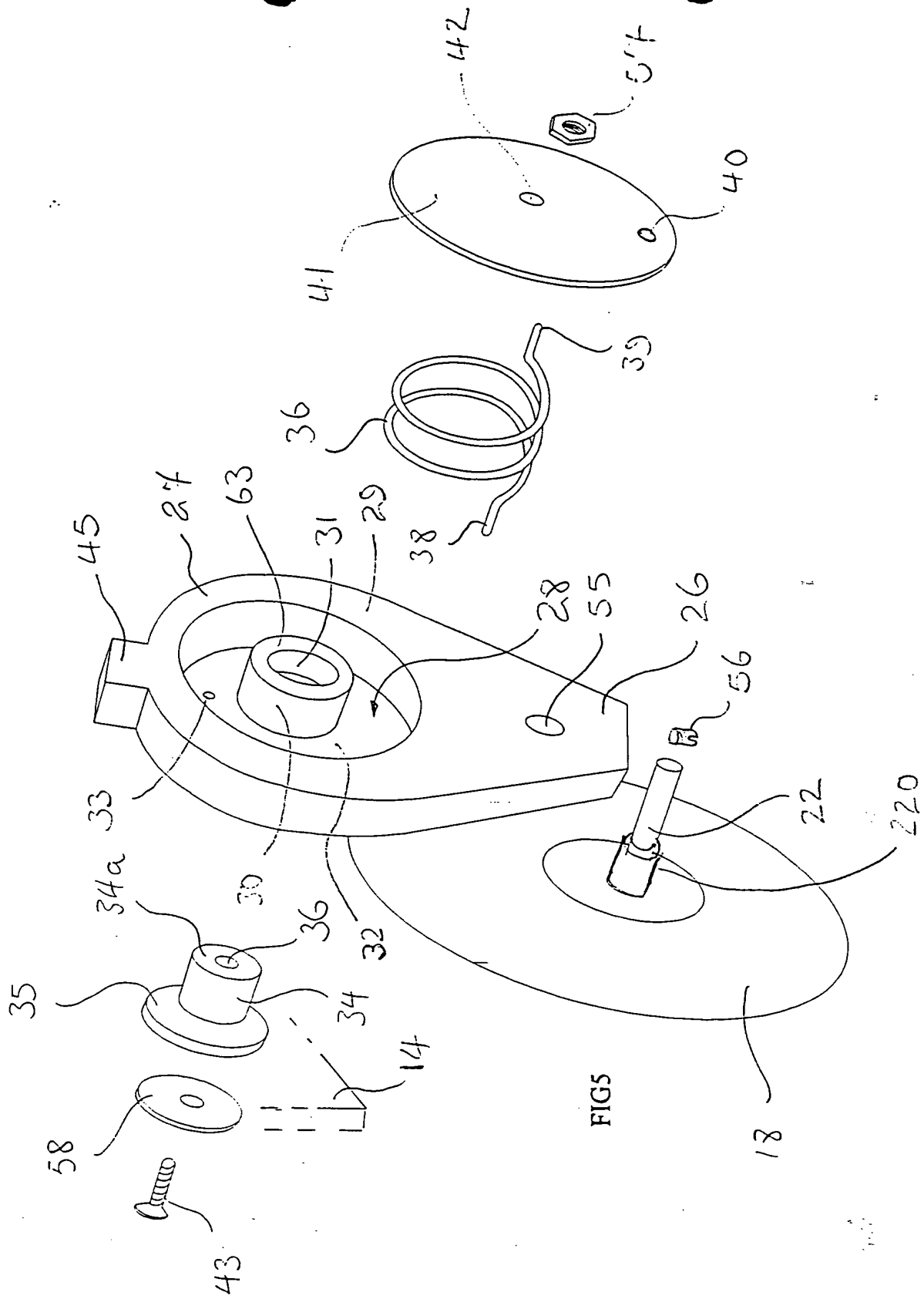


FIG 6

